## REMARKS

Claims 22-42 remain active in the application. Claims 22 and 29 are independent. By this Amendment, claim 22 has been amended to correct an informality, and claims 23 and 32 have also been amended. Claim 31 is canceled.

Claims 22-28, 23, and 31-33 stand rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness. Claims 22-30 and 34-42 stand rejected under 35 U.S.C. § 102(b) as anticipated by Liverani (U.S. Patent No. 5,738,001). Claims 31-33 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Liverani in view of Harrison (U.S. Patent No. 5,417,152).

### The Claimed Invention

The claimed invention, as represented by independent claim 22, is related to a method for controlling heating processes in a coffee machine, which is suitable for preparing coffee on the basis of coffee pads. In an exemplary embodiment, the coffee machine includes a continuous flow heater having an adjustable heating power and a pump for conveying water through the continuous flow heater, where the method includes the steps of measuring a first temperature in at least one of the area of the continuous flow heater and the water conveyed by the pump; and influencing the amount of water conveyed by the pump in response to the first temperature.

### Objections to the Drawings

The drawings stand objected to under 37 CFR 1.83(a), for failing to show every feature of the invention specified in the claims, specifically the feature of the slider

recited in claim 33. The drawings have been amended to show the slider element recited in claim 33. Replacement drawings are included with this Response. Support for the slider element of claim 33 is provided in the specification, including at paragraphs 0021-0023, and 0055.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the objection to the drawings.

**Objections to the Specification**

The specification stands objected to under 37 CFR 1.77(b), for failing to include titles of the sections of the specification. The specification has been amended to include titles of the sections of the specification, in compliance with 37 CFR 1.77(b).

The specification also stands objected to, due to a lack of technical disclosure within the body of the disclosure, specifically in paragraphs 0010 and 0011. The specification has been amended to delete paragraphs 0010 and 0011.

In light of these amendments, Applicants respectfully request reconsideration and withdrawal of the objections to the specification.

**The Rejections under 35 U.S.C. § 112**

Claims 22-28 stand rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness, resulting from the term "particularly" in claim 22. Claim 22 has been amended to remove the term "particularly." Claims 23-28 depend from amended independent claim 22, and thus no longer include the term "particularly." Accordingly,

Applicants respectfully request that the rejection of claims 22-28 under 35 U.S.C. § 112 be withdrawn.

Claim 23 stands rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness, resulting from the term "the brewing chamber" lacking antecedent basis. Claim 23 has been amended to overcome the rejection. Accordingly, Applicants respectfully request that the rejection of claim 23 under 35 U.S.C. § 112 be withdrawn.

Claims 31-33 stand rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness, resulting from the term "the flow resistance" in claim 31 lacking antecedent basis. Claim 31 has been canceled, and claim 32 has been amended to depend from claim 29. Accordingly, Applicants respectfully request that the rejection of claims 31-33 under 35 U.S.C. § 112 be withdrawn.

**The Rejections under 35 U.S.C. § 102(b)**

The Rejections under 35 U.S.C. § 102(b) based on Liverani

Claims 22-30 and 34-42 stand rejected under 35 U.S.C. § 102(b) as anticipated by Liverani (U.S. Pat. No. 5,738,001). Applicant traverses these rejections.

Independent claim 22, rejected under 35 U.S.C. § 102(b) as anticipated by Liverani, as amended recites a method for controlling heating processes in a coffee machine, which is suitable for preparing coffee on the basis of coffee pads, wherein the coffee machine comprises a continuous flow heater having an adjustable heating power and a pump for conveying water through the continuous flow heater, the method comprising the acts of:

measuring a first temperature in at least one of the area of the continuous flow heater and the water conveyed by the pump; and

influencing the amount of water conveyed by the pump in response to the first temperature.

Liverani does not disclose this combination of features. For example, Liverani does not disclose a method including measuring a first temperature in at least one of the area of the continuous flow heater and the water conveyed by the pump; and influencing the amount of water conveyed by the pump in response to the first temperature, as recited in claim 22.

With respect to these features, The grounds of rejection allege the following:

> Liverani discloses a . . . method comprising the acts of: measuring a first temperature (see col. 4, lines 48-55) in at least one of the area (Fig. 3; 13A) of the continuous flow heater and the water conveyed by the pump; and influencing the amount of water conveyed by the pump in response to the first temperature (as described in col. 1, line 9 - col. 2, line 31 and especially col. 1, lines 33-44 and see col. 4, lines 48-55)[.]

Office Action, page 5. Applicants respectfully disagree with the interpretation of Liverani as reflected in the grounds of rejection. The above-cited portions of Liverani disclose the following:

> The coffee machine according to said European Patent is provided with a water source, an electric pump to transfer the water to a coffee brewing chamber after passing through a heat exchanger that can instantly heat the water to the desired temperature considered the most suitable to provide a good coffee beverage from the coffee pad placed in the brewing chamber. a temperature that shall henceforth be defined as the reference temperature. while a water delivery counter means measures the

quantity of water transferred towards said chamber instant by instant. a temperature sensor senses the temperature of the water in the heat exchanger and a control device receives the signals from said water delivery counter means and said temperature sensor and processes them according to a set algorithm in order to control the electric resistor of the heat exchanger in such a way that the temperature of said resistor increases with the increase in the quantity of water transferred and, hence, that this water is kept at a reference temperature. It is known that the quantity of water transferred into the coffee cup also depends on the resistance exerted by the coffee pad held in the brewing chamber and that this resistance varies during the brewing of the coffee owing to the fact that said resistance increases as the coffee pad swells as it absorbs water. Note that this machine may also have a *programmed clock* as a counting device, obviously as a part of the control device, that measures the time the pump operates in transferring water and the control device is programmed so as to process the signals received from the clock and the temperature sensor according to a given algorithm and control that, after a first period of set time in which the water temperature is kept at the reference value, this temperature is left to drop gradually, until the clock has reached the maximum time set and therefore avoid a prolonged percolation at high temperature that may bring taste noxious substances into the cup.

Note also that in said European Patent a certain reference temperature, termed "starting temperature". was allowed to drop as a function of the time counted by the clock or as a function of the volume of water counted by the water delivery counter.

Another document is known, NL-A-8 803 163 from Verheijen B. V., which discloses a coffee machine comprising:

a water reservoir,

a water heating unit,

a feeding pipe between said water reservoir and the inlet of the heating unit,

a discharge duct close to the outlet of said heating unit and

a control unit: [sic]

Additionally, the following parts are comprised in the machine: a pump located along the feeding pipe, operation means for setting the temperature. said means directing pulses to the control unit, and a temperature sensor close to the outlet side of the water heating unit. On operation, the pump and the heating unit are

controlled from the control unit in such a way that. under a temperature increase sensed flora the temperature sensor higher than the temperature values as set from the control unit, the operation of the heating unit is temporarily stopped until the required temperature is reached, whilst under a temperature lowering below the set value, sensed from the temperature sensor, the pump is acted so that the water velocity along the discharge duct is reduced temporarily until the required temperature is reached again.

Moreover:

the pump is activated and stopped and may be adjusted stepless or at steps and, under said temperature lowering, is adjusted to a lower capacity in order to reach again the required temperature.

the water heating unit is activated and stopped

the water heating is adjustable stepless or at steps and the heating unit, under said temperature increase over the required temperature. is lead to a lower capacity in order to reach again the required temperature.

But with the passing of time. after the first realizations of this machine, and while new series were manufactured, a drawback was encountered that arose from the heat exchanger that. owing to the limited space available in the machines body, and for reasons of cost, the industry supplied increasingly smaller and, hence, with an increasingly limited thermal inertia. So, although the heat exchanger still maintains the capacity to instantly heat the water it contains, at the same time the temperature of the water that flows through it to be transferred to the brewing chamber, under the pump's action. may excessively vary compared to the reference value and cause the brewing of coffee lacking in the aromatic substances desired.

* * *

The control system 14A allows various function modes for the machine. Of these modes at least 4 depend on the detection of the coffee machine function parameters (such as the flow of water in duct 2 controlled by means of the water delivery counter 12 and the water temperature measured at the exit of the heat exchanger and that *may oscillate around the reference temperature as controlled by means of sensor 13*).

Liverani, col. 1, line 9 - col. 2, line 31; col. 1, lines 33-44; and col. 4, lines 48-55 (emphasis added). The method of Liverani clearly does not include influencing the amount of water conveyed by the pump in response to the first temperature, as recited in claim 22. For example, as shown in the underlined excerpt *supra*, Liverani includes a programmed clock used as a counting device, for measuring the amount of time that the pump operates. The control system of Liverani subsequently uses the output of the programmed clock to permit the temperature of heated water in the brewing chamber to drop. Thus for a variety of reasons, Liverani cannot anticipate the elements of claim 22:

1. the clock of Liverani is programmed, and therefore cannot influence the amount of water conveyed by the pump in response to a measured temperature;
2. the programmed clock of Liverani merely operates "as a counting device, . . . that *measures* the time the pump operates in transferring water" (italics added); and therefore does not influence the amount of water conveyed by the pump in response to a measured temperature; and
3. the programmed clock of Liverani includes a maximum time set to avoid "a prolonged percolation," i.e. the counting by the programmed clock is compared to a preset maximum time, in order to control the amount of time that heated water cools in the brewing chamber, and therefore does not influence the amount of water conveyed by the pump.

For at least these reasons, Liverani in no way discloses or implies a method including influencing the amount of water conveyed by the pump in response to the first measured temperature, as recited in claim 22. Furthermore, Liverani teaches away from the method of claim 22, since (1) the clock of Liverani is programmed with a set time, and (2) the set time is used to monitor heated water in the brewing chamber, not to influence the amount of water conveyed by a pump in response to the first temperature, as recited in claim 22.

As another example, as cited in the grounds of rejection, Liverani discloses

> detection of the coffee machine function parameters (such as the flow of water in duct 2 controlled by means of the water delivery counter 12 and the water temperature measured at the exit of the heat exchanger and that *may oscillate around the reference temperature as controlled by means of sensor 13*).

Liverani, col. 50-55 (emphasis added). This excerpt of Liverani reveals that Liverani in no way discloses or implies influencing the amount of water conveyed by the pump in response to the first temperature, as recited in claim 22. As the italicized portion of the excerpt makes clear, the measured water temperature may oscillate around the reference temperature. The excerpt also makes clear that it is the reference temperature--not the oscillating (measured) temperature--that comprises the referenced "coffee machine function parameters." Thus, assuming *arguendo* that Liverani measures water temperature at the exit of the heat exchanger, this excerpt of Liverani makes clear that it could only be the reference temperature--and not the actual measured temperature--that could be used to influence any other function of the coffee machine disclosed in Liverani. Thus, in no way does Liverani disclose or imply influencing the amount of water conveyed by the pump in response to the first measured temperature, as recited in claim 22. Furthermore, Liverani teaches away from influencing the amount of water conveyed by the pump in response to the first temperature, since Liverani teaches reference temperature—not measured temperature—as a basis for machine function parameters.

For at least the foregoing reasons, Applicants submit that claim 22 is not anticipated by Liverani. Accordingly, Applicants respectfully request reconsideration

and withdrawal of the rejection of claim 22 under 35 U.S.C. § 102(b) based on Liverani, and ask that the claim be permitted to issue.

Claims 23-28 depend from independent claim 22. Therefore, Liverani does not anticipate claims 23-28 for at least the reasons given above with respect to claim 22. Moreover, claims 23-28 are not anticipated by Liverani for reasons of their own. For example, claim 23 recites the method according to claim 22, further comprising measuring a second temperature between the continuous flow heater and a brewing chamber and influencing at least one of the amount of water conveyed by the pump and the heating power in response to the second temperature. Liverani fails to disclose this combination of features. The grounds of rejection allege the following:

> Liverani discloses . . . a second temperature sensor (Fig. 1, 3; 13) located between the continuous heater and the brew chamber (3) which measures a second temperature (also see col. 4, lines 3-15) and influencing at least one of the amount of water conveyed by the pump and the heating power in response to the second temperature (col. 4 line 60 - col. 5 line 50):

Office Action, page 5. Applicants respectfully disagree with the interpretation of Liverani as reflected in the grounds of rejection. At col. 4, lines 3-15 Liverani discloses the following:

> the module 24 to intermittently feed electricity to the vibrating pump 6 is connected by means of conductor 25 to the programmed control device 14A that processes the signals received from the temperature sensor 13 according to a given algorithm, so that the vibrating pump 6 is activated after three seconds from the moment in which the user has activated the machine to request a standard coffee, is disactivated when the water temperature drops below the *reference temperature* and is activated again when the water has re-acquired the *reference temperature* (the said three seconds is the

> time necessary to be certain that the water within the heat exchanger has reached the *reference temperature*).

(emphasis added) As this excerpt makes clear, Liverani discloses influencing the electricity fed to the pump 6 not in response to a measured temperature, but rather in response to a reference temperature. As such, Liverani in no way discloses or implies measuring a second temperature between the continuous flow heater and a brewing chamber and influencing at least one of the amount of water conveyed by the pump and the heating power in response to the second temperature, as recited in claim 23.

Further regarding claim 23, the grounds of rejection cite Liverani at col. 4, line 60 - col. 5, line 50, which discloses the following:

> i) an input for the water *reference temperature* in order to achieve control over the electric resistor of the heat exchanger. in compliance with the state of the art; this input is generally provided for, once and for all, by the manufacturer; according to prior art;
>
> ii) an input of the quantity and delivery of water by the pump, that is the quantity of beverage desired, in order to achieve control of the electric resistor of the heat exchange as a function of said quantity, in compliance with EP 0380947;
>
> iii) an input of the water temperature as detected by the temperature sensor in order to achieve control of the pump delivery according to prior art;
>
> iv) an input of the quantity and delivery of water to be transferred into the brewing chamber, that is of the volume of beverage desired by the user (e.g. a normal coffee or a diluted coffee) and an input of the water temperature detected by the temperature sensor again to obtain a consistent control, instant by instant, of the pump delivery and the resistor of the heat exchanger, in compliance with the present invention.
>
> Mode iii) is easily realized; a conventional control system of the PID (Proportional Integrative Derivative) type can be adopted or a proportional band control can be implemented, in which the

pump delivery varies proportionally as a function of the water temperature exiting the heat exchanger according to the function

Q=k'+k"(Tr-T) where:

k' and k" are two constants of the heat exchanger that depend on the characteristics of the pump delivery and of the thermal reactivity chosen for the system (exchanger and other parts of the machine),

Tr is the reference temperature.

T is the temperature measured at the heat exchanger exit.

In this case the heat exchanger must have its own control system and must be considered at a constant temperature between 1000 C. and 1200 C. This mode solves the problem of controlling the water temperature when using heat exchangers with very low thermal inertia.

Mode iv) may be realized with well known not classic control methods. such as, for example, neural networks, "fuzzy logic" controls or the multigoal control systems. The detailed explanation of the, realization of these modes does not appear to fail within the needs of the present patent document, and a person with normal knowledge of said control methods can solve the problem within the present context. We can recall that a fuzzy logic control can be realized by using, instead of an equation, a device normally traded, for example a unit by American Neuralogix NlX 230. based on a number of rules of the following kind:

if the temperature of the water exiting the heat exchanger drops, then cut down the pump delivery;

if said temperature drops and the pump delivery is at its minimum level. then increase the temperature of the heat exchanger;

(emphasis added). In the excerpted disclosure, Mode i) comprises the input of a water reference temperature for controlling the electric resistor of the heat exchanger, and thus does not anticipate influencing the heating power in response to the second temperature, as recited in claim 23.

Mode ii) comprises the input of a desired quantity of liquid for controlling the electric resistor of the heat exchanger, and thus does not anticipate influencing the heating power in response to the second temperature, as recited in claim 23.

Mode iii) comprises an input of *the* water temperature as detected by *the* temperature sensor for controlling pump delivery, and thus does not anticipate influencing the heating power in response to the *second* temperature, as recited in claim 23.

Mode iv) comprises an input of volume of beverage desired by the user and an input of *the* water temperature detected by *the* temperature sensor for controlling the pump delivery and the resistor of the heat exchanger, and thus does not anticipate influencing the heating power in response to the *second* temperature, as recited in claim 23. Thus, in no way does Liverani teach or disclose measuring a second temperature between the continuous flow heater and a brewing chamber and influencing at least one of the amount of water conveyed by the pump and the heating power in response to the second temperature, as recited in claim 23.

For at least the foregoing reasons, Applicants submit that claim 23 is not anticipated by Liverani. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 23 under 35 U.S.C. § 102(b) based on Liverani, and ask that the claim be permitted to issue.

Claims 24-28 depend from independent claim 22. Therefore, Liverani does not anticipate claims 24-28 for at least the reasons given above with respect to claim 22. Accordingly, Applicants respectfully request reconsideration and withdrawal of the

rejection of claim 24-28 under 35 U.S.C. § 102(b) based on Liverani, and ask that the claims be permitted to issue.

Independent claim 29, rejected under 35 U.S.C. § 102(b) as anticipated by Liverani, recites an apparatus embodying the elements of independent claim 22. Therefore, Liverani does not anticipate claim 29 for at least the reasons given above with respect to claim 22. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 29 under 35 U.S.C. § 102(b) based on Liverani, and ask that the claim be permitted to issue.

Claims 30 and 34-42 depend from independent claim 29. Therefore, Liverani does not anticipate claim s 30 and 34-42 for at least the reasons given above with respect to claim 29. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 30 and 34-42 under 35 U.S.C. § 102(b) based on Liverani, and ask that the claims be permitted to issue.

**The Rejections under 35 U.S.C. § 103(a)**

Claims 31-33 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Liverani in view of Harrison (U.S. Patent No. 5,417,152). Applicants traverse the rejections. As discussed *supra*, Independent claim 29, from which claims 31-33 depend, is neither anticipated nor taught by Liverani. Therefore, claims 31-33 are patentable over Liverani and Harrison for at least the reasons given above with respect to claim 29.

Moreover, the addition of Harrison does not overcome the failure of Liverani to disclose the features of claim 29. Claim 31 recites an electronic control device for

controlling heating process in a coffee machine for preparing coffee using coffee pads, where the coffee machine comprises a continuous flow heater having an adjustable heating power and a pump for conveying water along a conveying section through the continuous flow heater and a temperature sensor, wherein the electronic control device comprises means for influencing the amount of water conveyed by the pump in response to the temperature measured by the temperature sensor, wherein the means for influencing the amount of water conveyed includes a means for varying the flow resistance. Liverani and Harrison, alone or in any combination, do not disclose, teach or imply this combination of features.

The grounds of rejection admit that Liverani fails to disclose a means for restricting flow. Office Action, page 6. According to the grounds of rejection,

> Harrison discloses a potentiometer slider (324) which controls the speed of the flow based on the pressure output as influenced by the voltage setting (col. 9, lines 3-8). It would have been obvious to one of ordinary skill in the art at the of the invention to have modified the *fluid control system* disclosed by Liverani by incorporating a slider as disclosed by Harrison to vary the fluid output of the pump.

Office Action, page 6 (emphasis added). Applicants respectfully disagree.

Harrison discloses a speed controller for an electric motor, particularly for an electric motor used in a juice extractor. Specifically, Harrison teaches electric motor controls for maintaining constant speed of an electric motor under varying current loads. All of the controls disclosed and taught in Harrison are electric motor controls. Harrison neither discloses, teaches, nor implies anything related to fluid flow control, or more particularly, related to fluid flow restriction. In fact, Harrison teaches away from fluid

flow restriction, since Harrison teaches methods for maintaining a constant speed of an electric motor under changing loads. Furthermore, the varying motor loads disclosed in Harrison are not related to fluid flow at all. Rather, the varying motor loads disclosed in Harrison are related to the operation of knife blades "for comminuting the produce to release the juices." Harrison, col. 1, lines 19-20. For example, Harrison discloses the following at col. 5, lines 47-52:

> It is the function of speed regulating circuitry 112 to ensure that this operating speed remains constant as comestibles reach the blades 32 at the bottom of blade basket 16, increasing the load on motor 24, and as the comminution step reaches its end, decreasing the load on the motor.

Harrison simply discloses or teaches nothing related to fluid flow restriction. Thus Liverani and Harrison, alone or in any combination, do not disclose, teach or imply the features of claim 31. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 31 under 35 U.S.C. § 103(a) as unpatentable over Liverani in view of Harrison, and ask that the claim be permitted to issue.

Claims 32 and 33 depend from claim 31. Therefore, claims 32 and 33 are patentable over Liverani and Harrison for at least the reasons given above with respect to claim 31. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 31 and 32 under 35 U.S.C. § 103(a) as unpatentable over Liverani in view of Harrison, and ask that the claims be permitted to issue.

## CONCLUSION

In view of the above, entry of the present Amendment and allowance of claims 22-42 are respectfully requested. If the Examiner has any questions regarding this amendment, the Examiner is requested to contact the undersigned. If an extension of time for this paper is required, petition for extension is herewith made.

Respectfully submitted,

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